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**TEST # 2:**

Please show all your work in the test. Guessed answers are NOT acceptable. You may use calculators. Good luck!

(40 pt) 1) Find general solutions of the following differential equations:

a)  $y'' - 4y = 0$

b)  $y'' - 2y' + y = 0$

c)  $y''' - y'' = 0$

d)  $y''' - y'' - y' + y = 0$

(20 pt) 2) Find a general solution to  $y'' - 2y' = 0$ , and the solution for which  $y(0) = 1$  and  $y'(0) = 2$ .

(20 pt) 3) Find a general solution to  $y'' + 3y' - 4y = -32x^2$ , using the method of undetermined coefficients.

(20 pt) 4) Solve by variation of parameters the nonhomogeneous equation

$$y'' + 16y = 2 \cos(4x)$$